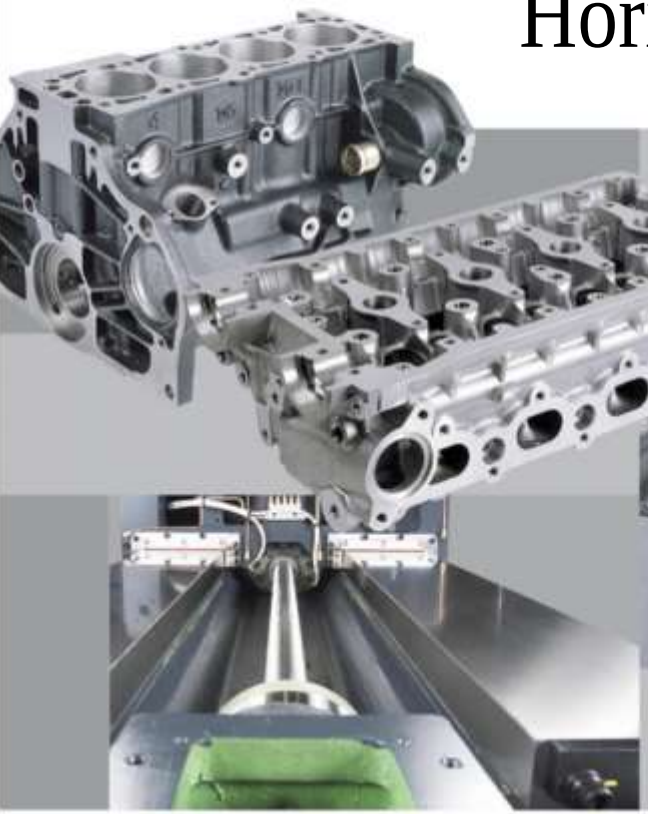
HM 5000 / 6300 / 8000

Heavy Duty Horizontal Machining Center

Designed for your productivity
Horizontal Machining Center



The HM series combines a high torque spindle drive and powerful axis drives for a large chip removal rate. The massive meehanite cast structure and wrap around box guideways provide the rigidity required for both heavy cutting and superb surface finishes. The machine is exceptionally stable and maintains excellent positioning accuracy and repeatability in any environment.

Heavy Duty Horizontal Machining Center

HM 5000 / 6300 / 8000

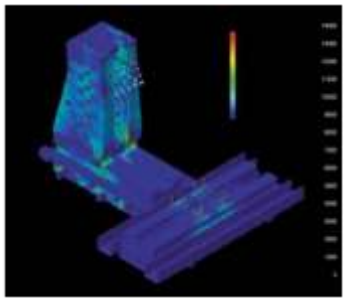
High Rigidity HM series

Stable bed and column assembles support heavy duty machining

The machine is designed to build rigidity into a stable body. The construction of the machine was thoroughly examined from the stage of basic design to ensure consistent high-speed and high-accuracy operation. The deformation of the bed when subject to a load at the center was simulated to secure high level rigidity against bending.

Measures against thermal distortion

The machine proper is insulated from heat sources to provide high stable machining accuracy. Machine-generated heat, such as from the control panel, spindle lubricant temperature controller or hydraulic unit, is more likely to distort the bed or column than the effects from changes in ambient temperature, causing a reduction in machine accuracies.



Dynamic rigidity

Improving the frequency response and ability to dampen vibration makes it possible to increase the high eigenfrequency up on the previous model.

Static rigidity

The high rigidity structure of HM has raised the static rigidity up more than previous model with no weak point through FEM analysis.

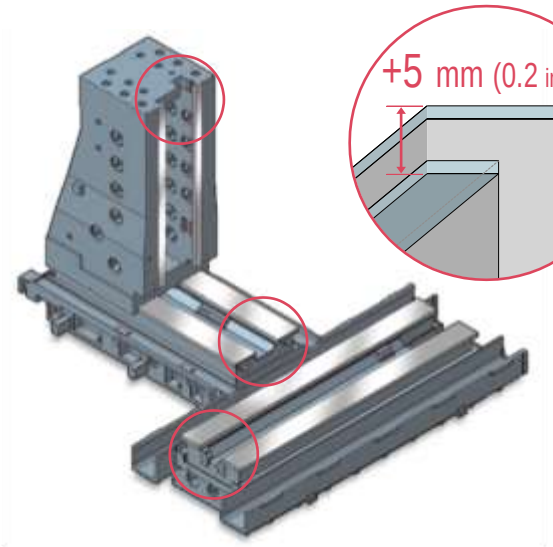
• FEM analysis used to design a stable body. (FEM : Finite Element Method)

Guideways and Axis Drives

Box guideway technology provides higher dampening properties of heavy duty applications.

Rapid traverse 32 m/min (12.6 ipm) opt.
24 m/min (9.4 ipm)

Doosan Infracore HM Series machining centers with oversized AC servo drives power through the toughest cuts in the toughest metal. The high torque servos are coupled directly to the ball screws. With no gears there is no risk of backlash or servo drag. The X and Z axes ball screws are center mounted, pretensioned and supported on both ends by high precision angular contact thrust bearings. This pretension design provides outstanding positioning repeatability with minimize thermal growth. In the event of a sudden impact, a flexible coupling on each axis flexes and absorbs the shock.

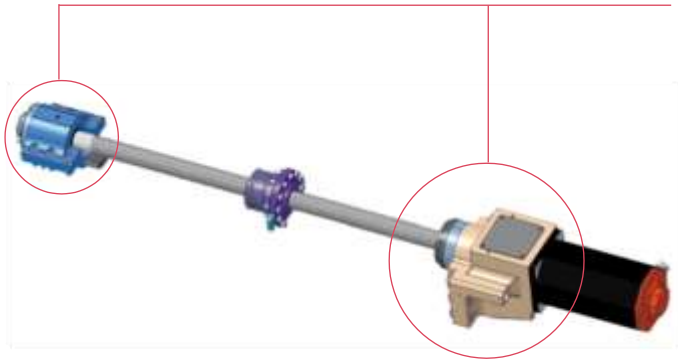


Expanded box guide way

The expansion of sliding space has upgraded dynamic characteristic.

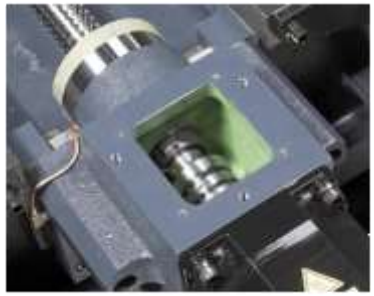
Scraping of surface

Fluroplastic resin, Rulon® 142, is bonded to the mating way surfaces, for its wear and friction characteristics and then hand scraped for a perfect fit.



Upgrade of motor brackets & Support brackets of all axes

Upgraded brackets provide unsurpassed rigidity a nd higher precision.



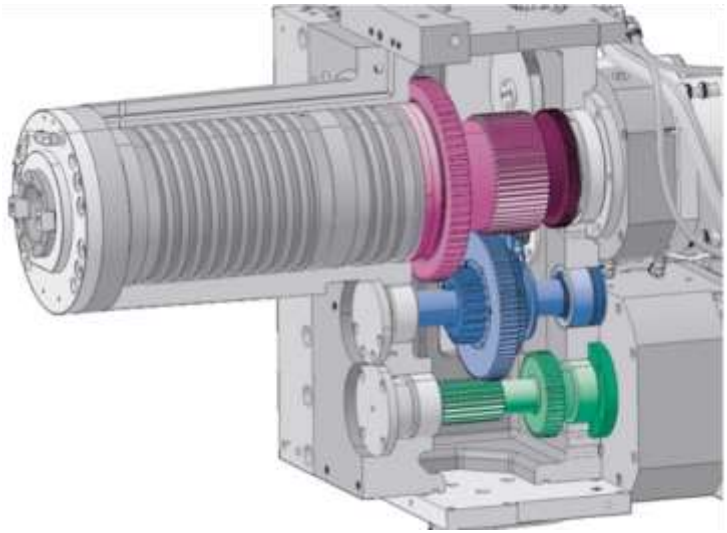
High Power

HM series

Heavy duty / high torque spindle provides optimum performance for heavy duty machining

Spindle Head

The spindle shows excellent performance for a wide range of materials from heavy-duty cutting of steel to high speed cutting of nonferrous materials. Heavy duty, 50 taper spindles are supported by four, permanently lubricated angular-contact spindle bearings, precision class P4. The bearings are assembled using a stepped sleeve system. This permits precise adjustment, and eliminates the possibility of assembly damage typical of lock nut systems. A heavy duty / high torque AC motor delivers power to the three-speed geared head, and provides high speeds and low-end torques for a broad range of applications. An encoder, attached to the spindle, allows rigid tapping in both high and low gear ranges.



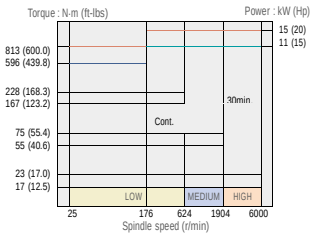
A stepped sleeve system is used for the axial fixation of the spindle bearing so that the bearings can be fixed at right angle to the machine. The 3-step spindle drive system provides a wide speeds for high-torque heavy-duty machining. The speed range is 20 to 6000 r/min. Powerful high-speed and precision spindle configuration.
[Max 6000 r/min, 22 kW (30 Hp)]

	Max. spindle speed	Motor (Cont. / 30 min)	Max. spindle torque
HM 5000	6000 r/min	11 / 15 kW (15 / 20 Hp)	813 N·m (600 ft-lbs)
	6000 / 8000 r/min	15 / 18.5 kW (20 / 25 Hp)	1003 N·m (740.2 ft-lbs) opt.
HM 6300	6000 r/min	18.5 / 22 kW (25 / 30 Hp)	1680 N·m (1239.8 ft-lbs)
	6000 r/min	22 / 26 kW (30 / 35 Hp)	1989 N·m (1467.9 ft-lbs) opt.
	8000 r/min	22 / 26 kW (30 / 35 Hp)	1410 N·m (1040.6 ft-lbs) opt.
HM 8000	6000 r/min	18.5 / 22 kW (25 / 30 Hp)	1680 N·m (1239.8 ft-lbs)
	6000 r/min	22 / 26 kW (30 / 35 Hp)	1989 N·m (1467.9 ft-lbs) opt.
	8000 r/min	22 / 26 kW (30 / 35 Hp)	1410 N·m (1040.6 ft-lbs) opt.
	6000 r/min	30 / 37 kW (40 / 50 Hp)	3687 N·m (2721.0 ft-lbs) opt.

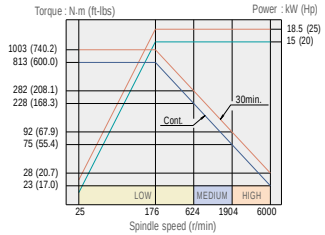
Spindle power-torque diagram

HM 5000

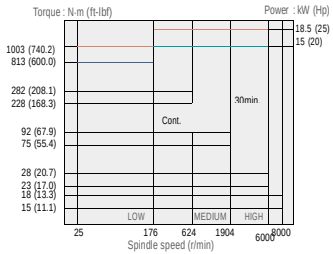
FANUC a12 - Spindle 6000 r/min



FANUC a15 - Spindle 6000 r/min opt.

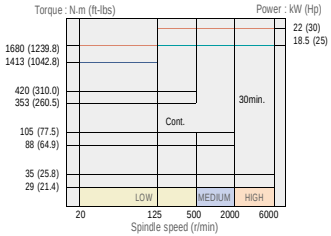


FANUC a15 - Spindle 8000 r/min opt.

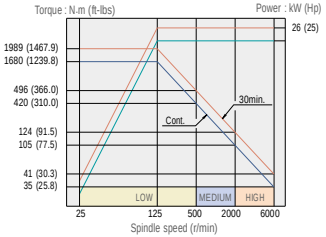


HM 6300/8000

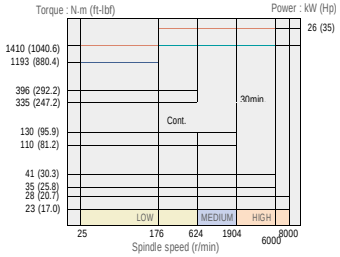
FANUC a18 - Spindle 6000 r/min



FANUC a22 - Spindle 6000 r/min opt.

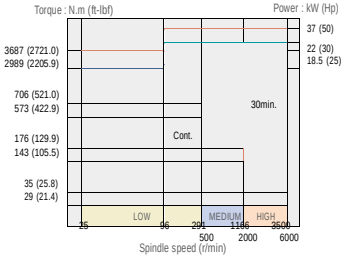


FANUC a22 - Spindle 8000 r/min opt.



HM 8000

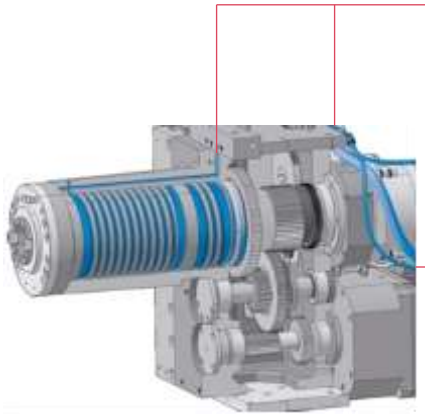
FANUC a30 - Spindle 6000 r/min (only HM8000) opt.



Dual contact system (Big plus) std.

The dual contact system offers simultaneous dual contact between the machine spindle face and toolholder flange face, as well as the machine spindle taper and long toolholder taper shank. This system is based on the most currently available standards for BT, DIN and CAT flange tooling.

- Higher rigidity
- Improved ATC repeatability, surface finish and higher precision machine
- Extended tool life



Oil cooler

The temperature of the hydraulic oil is regulated by a refrigerated cooling system. It maintains uniform controlled temperature required for high accuracy.

Lubrication

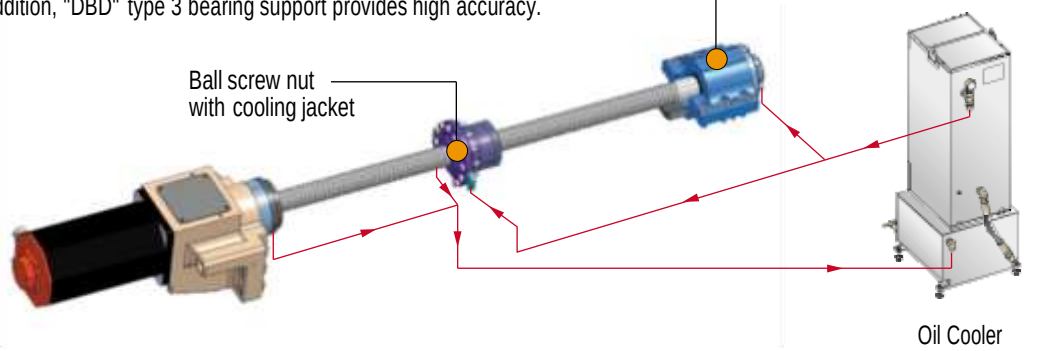
Automatic lubrication is provided to the guideways, ball screws and spindle earbox. Way lubrication oil is delivered by piston distributors which precisely meter the volume of oil. A low-level alarm prevents the machine from restarting.

High Precision HM series

Designed for exceptional high accuracy and minimized thermal displacement

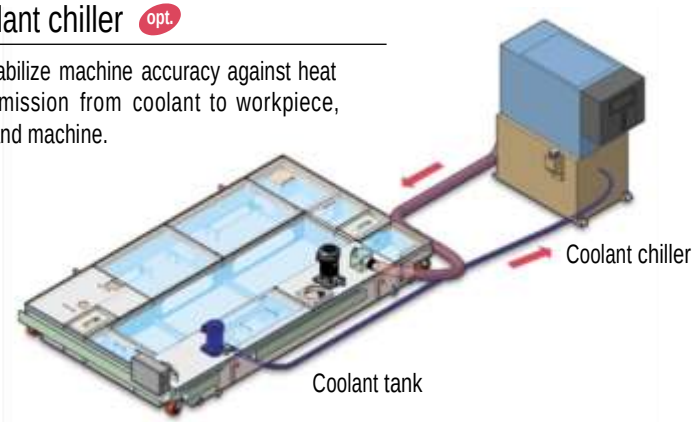
Minimum thermal transfer for high accuracy

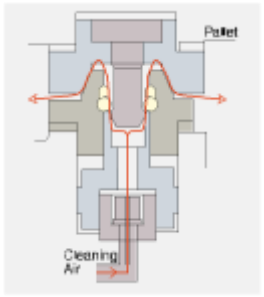
Machine units are designed to minimise the thermal transfer by applying cooling jackets to ballscrew nuts and ball screw shaft cooling (option). In addition, "DBD" type 3 bearing support provides high accuracy.



Coolant chiller opt.

To stabilize machine accuracy against heat transmission from coolant to workpiece, tool and machine.





Pallet clamp

During pallet change cycle, strong jets of air are discharged from the taper cones on the machine table which removes any chips and provides a clean surface for location of the pallet onto the machine, high repeatability of pallet location and optimum rigidity is therefore achieved.

Linear scale feedback system opt.

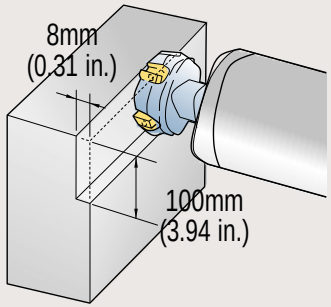
Linear scale feedback system is available to XYZ axes to provide true position closed loop feedback and improve machine accuracy.

Machining Performance

Provides high-productivity and high-accuracy in variety of machining operations

HM 5000

α 12 - spindle 6000 r/min



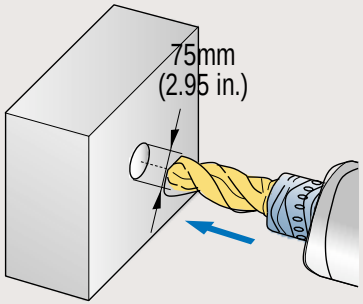
Face mill — Carbon steel (SM45C)

ø125mm (4.92 inch) Face mill (8Z)

Machining rate

440 cm³/min (17.32 in³/min)

Spindle speed	Feedrate
350 r/min	550 mm/min (21.7 ipm)



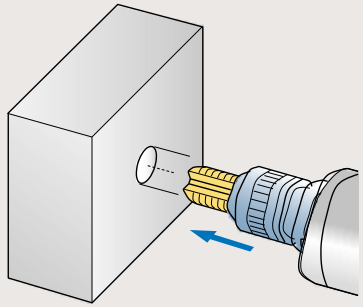
Drill — Carbon steel (SM45C)

ø75mm (2.95 inch) Drill (2Z)

Machining rate

265 cm³/min (10.43 in³/min)

Spindle speed	Feedrate
176 r/min	12 mm/min (4.7 ipm)



Tap — Carbon steel (SM45C)

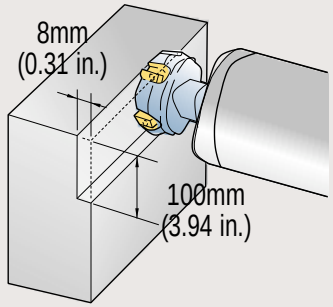
Tool

M48 x 5

Spindle speed	Feedrate
176 r/min	880 mm/min (34.6 ipm)

HM 6300 / 8000

α 18 - spindle 6000 r/min



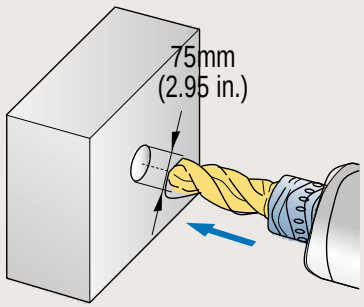
Face mill — Carbon steel (SM45C)

ø125mm (4.92 inch) Face mill (8Z)

Machining rate

800 cm³/min (31.50 in³/min)

Spindle speed	Feedrate
350 r/min	1000 mm/min (39.4 ipm)



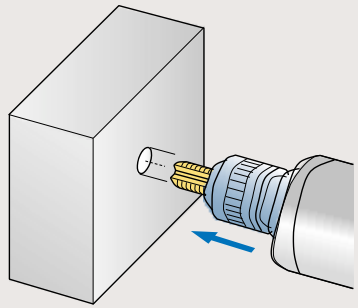
Drill — Carbon steel (SM45C)

ø75mm (2.95 inch) Drill (2Z)

Machining rate

318 cm³/min (12.52 in³/min)

Spindle speed	Feedrate
200 r/min	24 mm/min (9.4 ipm)



Tap — Carbon steel (SM45C)

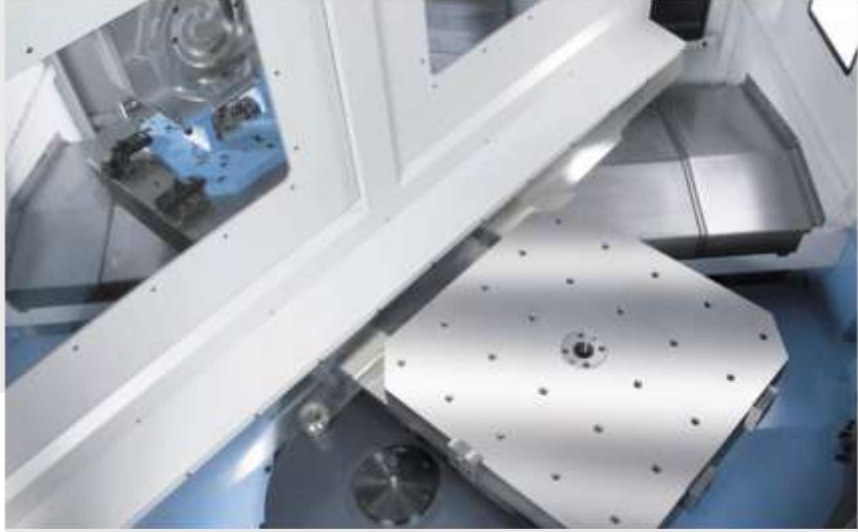
Tool

M48 x 5

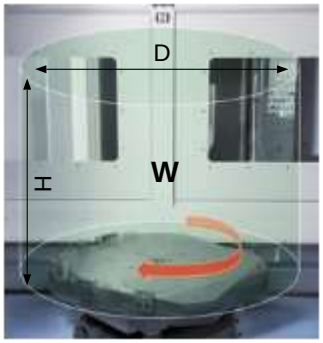
Spindle speed	Feedrate
125 r/min	625 mm/min (24.6 ipm)

Automatic Pallet Changer

HM series



HM 5000/6300/8000 machining center are equipped with rotary shuttle type APC (Automatic Pallet Changer) as a standard feature. It provides high reliability and wide working area for easy setup. Rotary shuttle APC provides faster changing time and easy adoption for automated system in small sized machine.



Table

Minimum table indexing angle 1˚, 0.001˚ opt.

		HM 5000	HM 6300	HM 8000
Pallet change time	s	14	25	29
Table indexing time (0➞90°)	s	2.2	3.7	3.9
Pallet size	mm (inch)	500 x 500 (19.69 x 19.69)	630 x 630 (24.8 x 24.8)	800 x 800 (31.50 x 31.50)
Max. workpiece size (D x H)	mm (inch)	ø800 x H800 (ø31.50 x H31.50)	ø1000 x H1000 (ø39.37 x H39.37)	ø1310 x H1200 (ø51.57 x H47.24)
Max. workpiece weight (W)	kg (lb)	800 (1763.7)	1200 (2645.5)	1600 (3527.3)

Operation APC panel

Interface for fixture

Fixture check list (for hydraulic / pneumatic fixtures)

Number of ports

☐ 2*1 x 2*2 Line ☐ 2*1 x 3*2 Line

☐ 2*1 x 4*2 Line ☐ 2*1 x 6*2 Line

*1 : Pallet No.1 and No.2 (Number of Pallet)

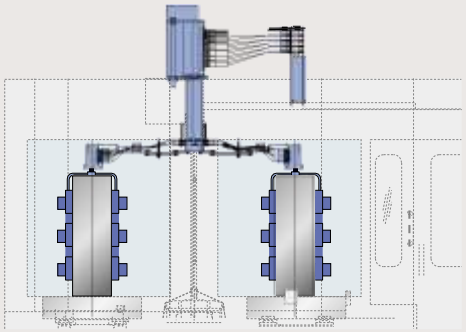
*2 : Number of port line

Hydraulic power unit

Special requirement

_____L/min (gal/min) at _____MPa (psi)

• Contact Doosan for more information



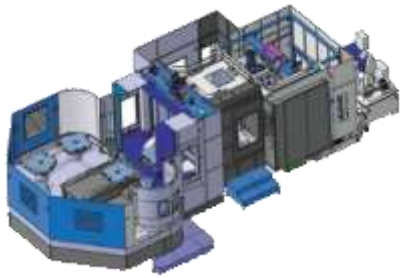
Automation*

* : Pre discussion required

- High Productivity & Availability
- Flexible production solutions
- High efficiency system
- Compact designed technology
- Easy to extend stations

Multi Pallet Station [MPS] opt.

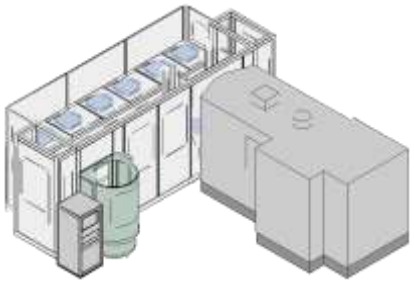
Unit : mm (inch)



Machine	MPS Model	Max. Work piece Size	Pallet Size
HM 5000	7-MPS / 9-MPS	ø800 x H 800 (ø31.5 x H 31.5)	500 x 500 (19.7 x 19.7)
HM 6300	7-MPS / 9-MPS	ø950 x H 1000 (ø37.4 x H 39.4)	630 x 630 (24.8 x 24.8)
HM 8000	7-MPS / 9-MPS	ø1250 x H 1200 (ø49.2 x H 47.2)	800 x 800 (31.5 x 31.5)

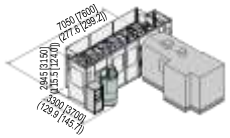
Linear Pallet System [LPS] opt.

Unit : mm (inch)



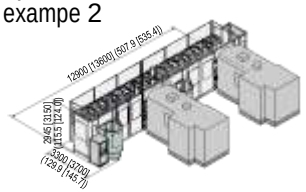
Pallet Size	Basic Spec.	Expansion Spec.
400 x 400 (15.7 x 15.7) 500 x 500 (19.7 x 19.7)	12 Pallet / 1 Set-Up / 1 Machine	Max. 36 Pallet / Max. 2 Set-Up / Max. 3 Machine
630 x 630 (24.8 x 24.8)	10 Pallet / 1 Set-Up / 1 Machine	Max. 30 Pallet / Max. 3 Machine
800 x 800 (31.5 x 31.5)	8 Pallet / 1 Set-Up / 1 Machine	Max. 20 Pallet / Max. 3 Machine

System exampe 1



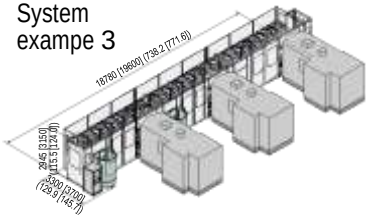
Machine	1
Number of Pallet	12 (10 / 8)
Set-Up Station	1

System exampe 2



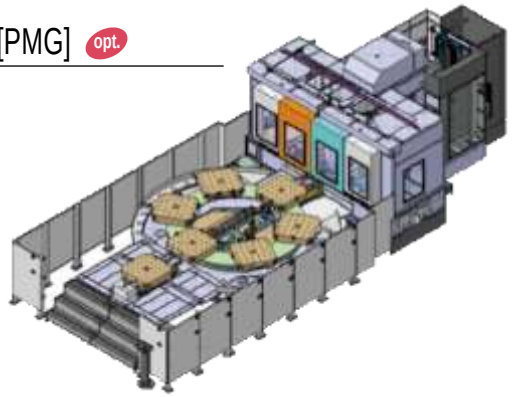
Machine	2
Number of Pallet	24 (20 / 16)
Set-Up Station	2

System exampe 3



Machine	3
Number of Pallet	36 (30 / 24)
Set-Up Station	2

Pallet Magazine [PMG] opt.



No.	Machine	PMG Model	Max. Workpiece size : mm (inch)	Max. Workpiece Weight : kgf (lbs)	Pallet Size mm (inch)
1	HM 1000	6-PMG	ø2000 x H 1475 (ø78.7 x H 58.1)	2000 (4409.2)	1000 x 1000 (39.4 x 39.4)
2	HM 1250	6-PMG	ø2000 x H 1725 (ø78.7 x H 67.9)		1250 x 1250 (49.2 x 49.2)

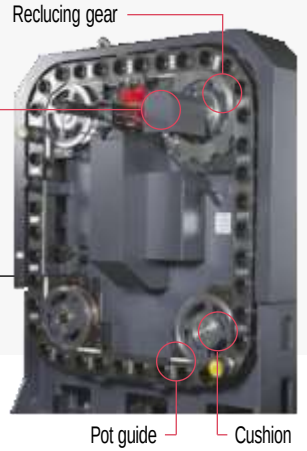
Doosan pallet retreat function opt.

This function enables the processing of new work piece after retreating of failed work piece caused by broken tool or machine fault. To realize this function, one of following option is necessary at least.

- Tool load monitoring function
- Automatic workpiece measurement
- Auto tool length measurement
- Tool breakage detector

Automatic Tool Changer

HM series



Servo magazine

Max. 0.9 s/pot

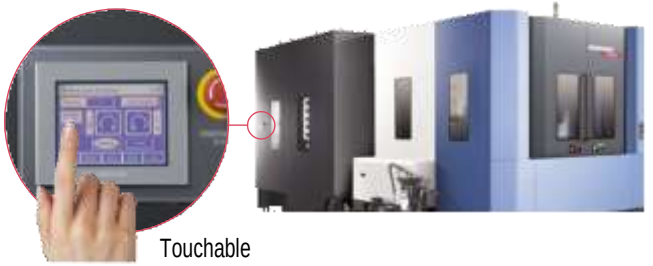
Tool change time (T-T-T) 2.5 s

Sophisticated mechanisms drastically reduce non-cutting time.

The ATC is composed of tool magazine and change arm. ATC is located separately from the machine in order to prevent adverse effects on accuracy due to vibration or other causes even when the ATC is operated during machining operation. The tools are selected by fixed address method that follows the shorter path. All tools are returned to the pots from which they were originally taken so that collision problems involving large-sized tools need to be considered only once when they are first mounted. A bi-directional magazine takes the shortest path.

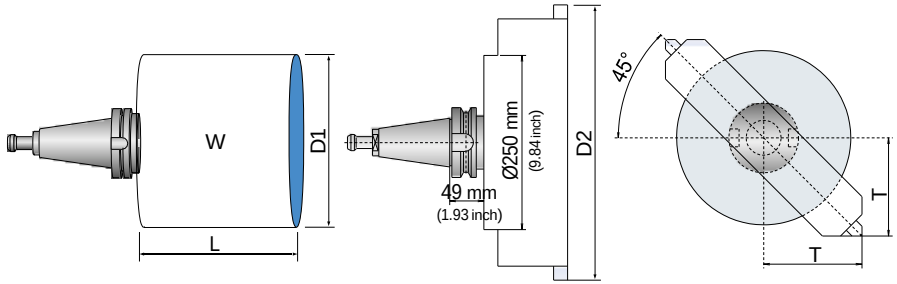
Operation Panel for ATC

- Enable the manual operations.
- Display the magazine status. (In/out signals and issued alarms)
- Data input of tool offset possible.



Touchable

Maximum Tool Size

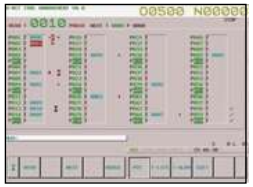


(Non-circular tool, Boring bar)

		HM 5000	HM 6300	HM 8000
Max. tool diameter	D1 mm (inch)	ø130 (5.12) [Continuous] / ø250 (9.84) [Adjacent ports are empty]		
	D2 x T mm x mm (inch x inch)	ø325 x 116.2 (12.8 x 4.57)	ø370 x 132.1 (14.57 x 5.2)	ø395 x 140.9 (15.55 x 5.55)
Max. tool length	L mm (inch)	400 (15.75)	550 (21.65)	550 (21.65)
Max. tool weight	W kg (lb)	25 (55.1)		

Doosan Tool Management

Tool Monitoring System is one of safety functions to protect Tool and Spindle against a possible damage of abnormal load caused by tool wear and breakage or others. This system montitors the tool status during machine operation by detecting the abnormal load of exch axis and spindle.



Tool management function opt.

This functions consisted of tool pre-check function, substitute tool selection with tool life management and different tool & port number command function.

Tool load monitoring system opt.

The screen shows a tool and pallet No., load meter of each axis and spindle limit load.

Other opt.

- Tool life management function (FANUC)
- Tool prechecking function
- Spare tool exchange function
- Different tool & Pot number command function
- Substitution tool selection function
- Tool retract function

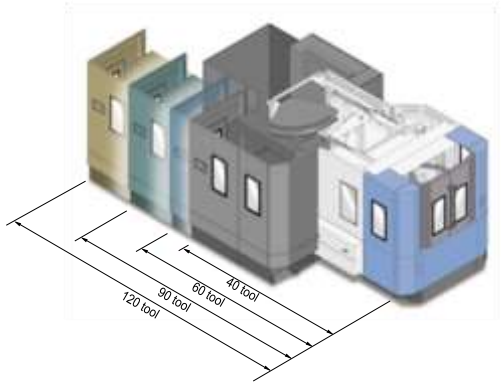
U-axis tool application opt.

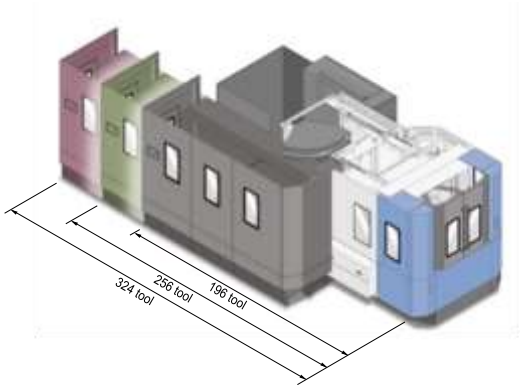
Automatic tool length measurement opt.

Tool breakage detector opt.

Tool Magazine

Numerous Variations to meet production efficiency needs





Servo magazine (40 / 60 / 90 / 120 tool)

		HM 5000	HM 6300	HM 8000
40 tool	mm	4052	4481	5142
	(inch)	(159.5)	(176.4)	(202.4)
60 tool opt.	mm	4506	4941	5601
	(inch)	(177.4)	(194.5)	(220.5)
90 tool opt.	mm	5461	5868	6538
	(inch)	(215.0)	(231.0)	(257.4)
120 tool opt.	mm	6354	6763	7431
	(inch)	(250.2)	(266.3)	(292.6)

Matrix magazine (196 / 256 / 324 tool)

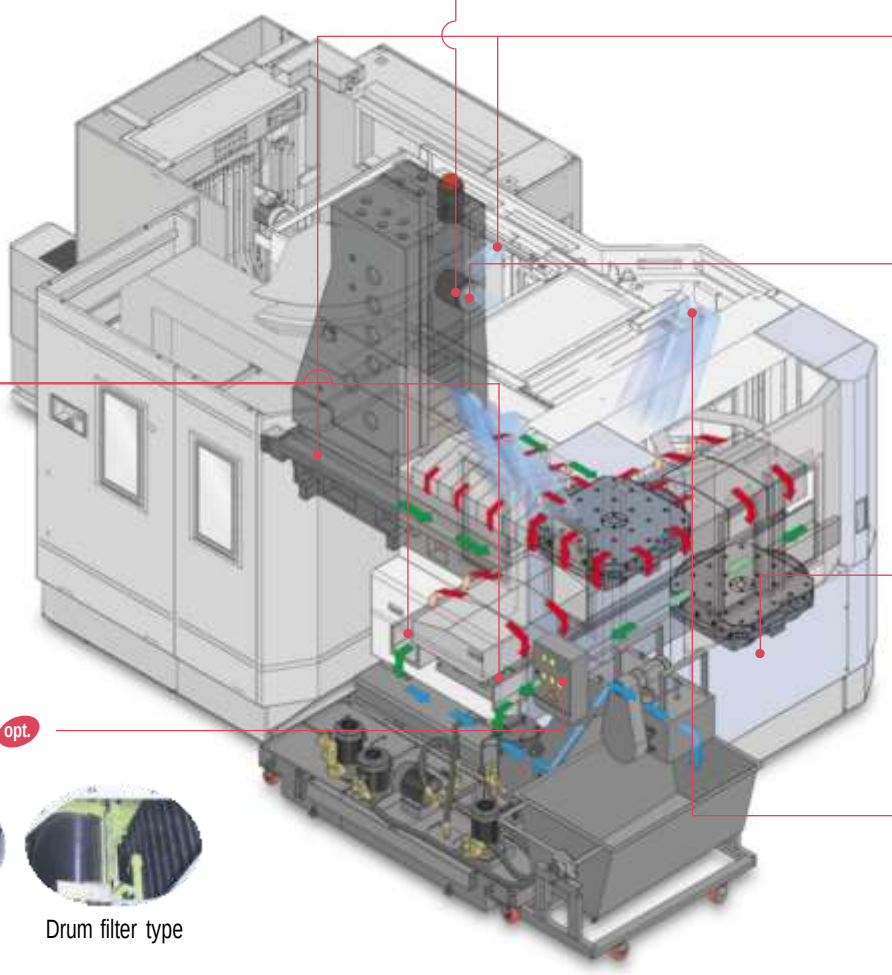
		HM 5000	HM 6300	HM 8000
196 tool opt.	mm	6510	7072	7610
	(inch)	(256.3)	(278.4)	(299.6)
256 tool opt.	mm	7560	8122	8660
	(inch)	(297.6)	(319.8)	(340.9)
324 tool opt.	mm	7935	8497	9035
	(inch)	(312.4)	(334.5)	(355.7)

Ergonomic and Eco-Friendly Design

HM series

Easy Chip Removal Structure

Separate chip conveyor and coolant tank provide easy cleaning and maintenance.The completely enclosed HM series virtually guarantees the confinement of chips and coolant to the inside of the machining area. Screw conveyors clearly remove the chips out of the machine.



Screw conveyor

Chip conveyor & Coolant tank opt.

Hinge type

Scraper type

Drum filter type

Flood coolant

Flushing coolant (Bed & Head)

Through spindle coolant opt.

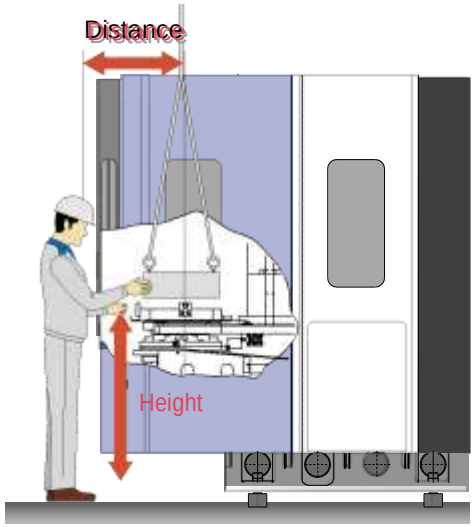
Middle pressure 1.96 Mpa (284.2 psi)
High pressure 6.86 Mpa (994.7 psi)

Coolant gun opt.

Shower coolant opt.

Easy Setup

HM 5000	Distance	540 mm (21.26 inch)
	Height	1120 mm (48.03 inch)
HM 6300	Distance	550 mm (21.65 inch)
	Height	1235 mm (48.62 inch)
HM 8000	Distance	785 mm (30.91 inch)
	Height	1250 mm (49.21 inch)



Collection of waste lublication oil

Less waste lubrication oil extends the life time of the coolant water and cut down the grime and offensive smell of the machine inside.

No coolant leakage

Rigorously designed, manufactured and tested machine covers do not permit coolant leakage in any condition. The factory always keeps our environment clean.

Oil skimmer opt.

Another suggestion to prolong the life time of the coolant water. A belt-driven type oil skimmer picks up and removes waste oil from the coolant tank that is easily drained.

Portable MPG

Portable MPG makes a workpiece setting easier for the operator.

Oil mist collector opt.

Minimum quantity lublication opt.

Tool Load Monitoring Function opt.

Doosan Tool load Monitor function allows you to protect axes and following tools from abnormal load in the servo axis due to tool wear and breakdown during the cutting process, by tool skipping or generating FEED HOLD alarm.

Main menu

- Automatically senses the tool's cutting load status while machining and stores the data
- Automatic diagnosis of tool wear and breakdown during overload while machining
- Provides five different types of work tables depending on the work pieces
- Provides additional 4/5 axis
- Equipped with easily operable self HELP function

Tool load menu

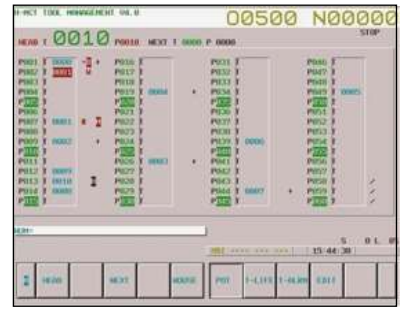
Alarm history display menu

Help menu

Data backup menu

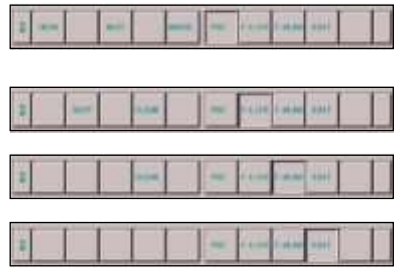
Tool Management Function opt.

- Tool number registration / change / deletion available
- Editing and display of FANUC current tool wear status
- Tool & tool pot List Table
- Tool number search
- Tool condition display
- Available tool pre-check function



Main menu

Tool status
P002 T 0081 *#WBHN+M /
Pxxx : POT number
Txxxx : Tool number
* : Tool life expiration
# : Tool skipping
W : Tool life warning alarm
B : Tool breakdown alarm
H : Spindle tool
N : Tools ready
+ : FANUC tool life group setting tool
M : FANUC tool life group setting ERROR
/ : Unavailable POT



Menu settings

POT
1. Spindle / manual change of the tools ready (for maintenance purposes only)
2. Setting 'use of big tool or spare tool' (/display)

T-LITE Tool life status editing on the selected tool

T-ALRM Clear : clearing tool warning / breakdown alarm

EDIT Manual setting / deletion of tool number (for maintenance purposes only)

Tool Pre-check Function opt.

This function allows you to prevent machine and work piece damage due to mishandling. It also prevents undesirable tool status by checking the tool status prior to use.

M-code for this function

M286 : Tool pre-check ON
M287 : Tool pre-check OFF

Program implementation example

Put M286 order at the head of the tool that you want to check and end with M287 order.

O0100 (CUTTING PROG.);
M286 ; ➡ Tool pre-check ON
T10 ; ➡ Tool 10 check whether the tool is OK or not
T20 ; ➡ Tool 20 check whether the tool is OK or not
T100 ; ➡ Tool 100 check whether the tool is OK or not
T110 ; ➡ Tool 110 check whether the tool is OK or not
M287 ; ➡ Tool pre-check OFF
.
M30 ; ➡ Program end

Different Tool & Pot Number Command Function

Tool number and pot number are generally the same,but this function can be used when different numbers are desired; first set tool number "2" on pot number "1" and call tool number "2" using T02, and then the tool number on pot number "1" will be called. However, only numbers below 1000 are required to be used because the numbers "T1000" and above are generally used for the FANUC tool life management group function.

Pallet Retract Function opt.

This function is to automatically stop the machining of the work piece and return the pallet when the tool breaks down, and call a new pall et with the next work piece through program (Scheduler) implementation, therefore machining without stopping the machine can be achieved by automatically calling the next pallet.
However, it is only available for machines equipped with the optional sensor device.
(i.e. TS27R)

M288 : Retreat function ON
M289 : Retreat function OFF

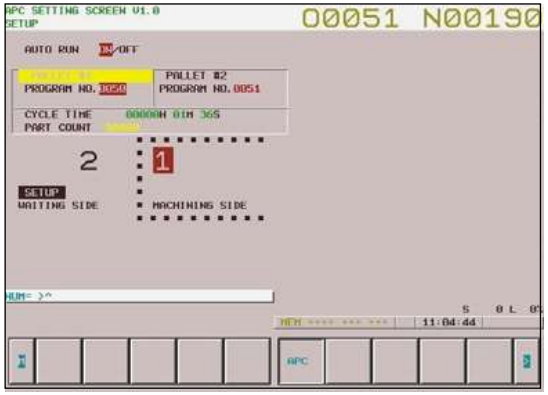
Sample program

O0100 (CUTTING PROG.);
M288 ; ➡ Retreat function ON
.
T10 ; ➡ Tool 10 call
M06 ; ➡ ATC
T20 ; ➡ Tool 20 call
G91G28X0.Y0.Z0. ; ➡ Reference pos. return
G01G91X-200.Y-200.Z-200.F500 ; ➡ Machining
M06 ; ➡ Tool change
T100 ; ➡ Tool 100 call
.
M289 ; ➡ Retreat function OFF
M30 ; ➡ Program end

Detecting tool damage

APC Schedule Function

When you use the standard APC, the menu screen displays status of each pallet and allows you to set the machining program.

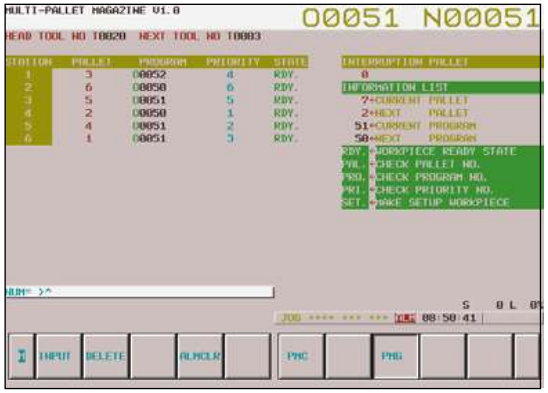


- Allows machining program setting for each pallet
- Displays machining hours and quantities
- Allows the checking of the 'work piece set-up' setting
- Displays the number of currently running programs
- Allows the checking of the current position of each pallet

Pallet Magazine Schedule Function

std. PMG only

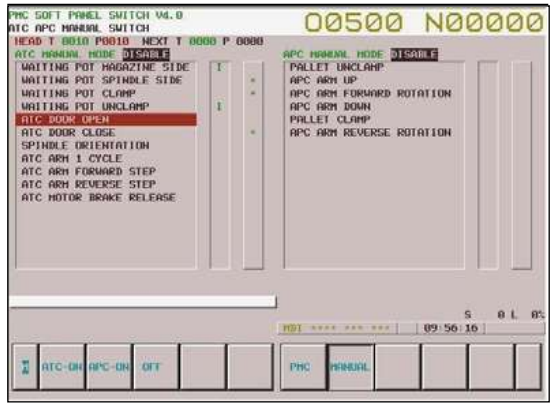
When you use the oil press Pallet Magazine, the menu screen allows the checking on the status of each pallet and the setting machining programs and the machining sequence.



- Allows the checking of the present / next pallet information
- Machining sequence setting for each pallet
- Machining program setting for each pallet
- Allows pallet interrupt setting
- Allows the checking of the setup information for each pallet

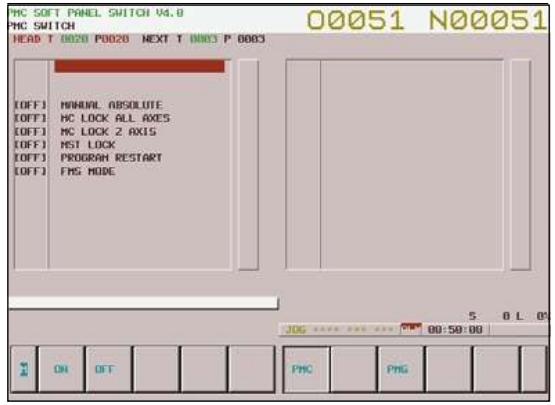
Easy Manual Operating Screen

ATC / APC manual operating



- Manual button arrangement considering the operating sequence
- Displays the conditions for starting operation : 'I'
- Displays the current status : '*'

PMC switch

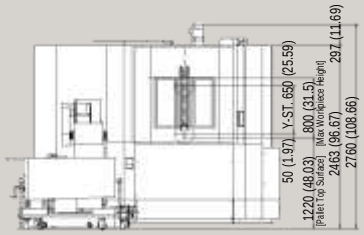


External Dimensions

Unit : mm (inch)

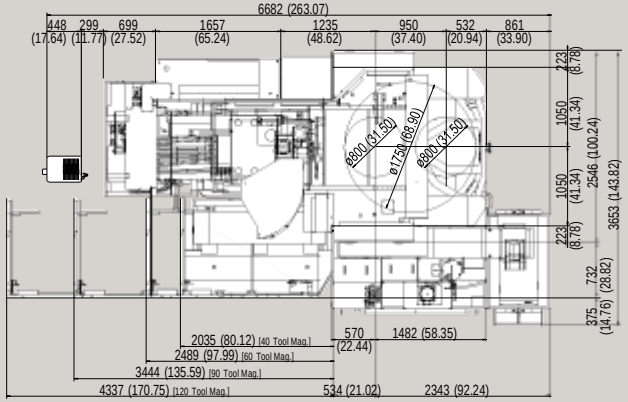
HM 5000

Front View



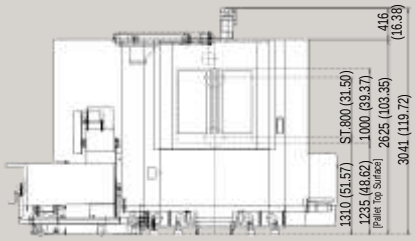
Side View

Top View

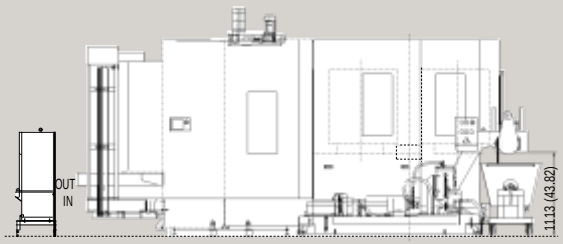


HM 6300

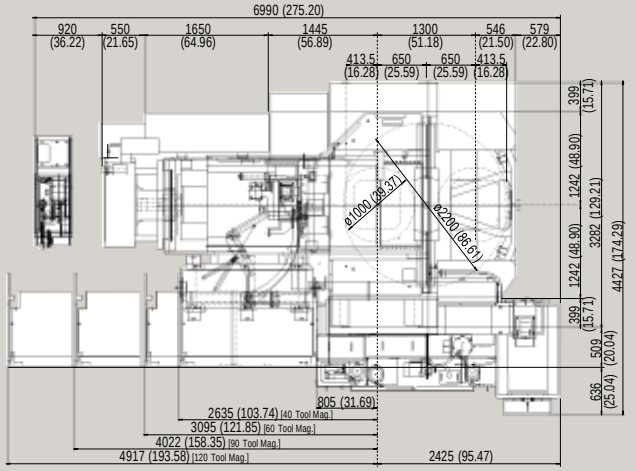
Front View



Side View



Top View

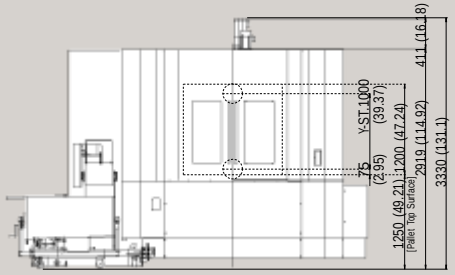


External Dimensions

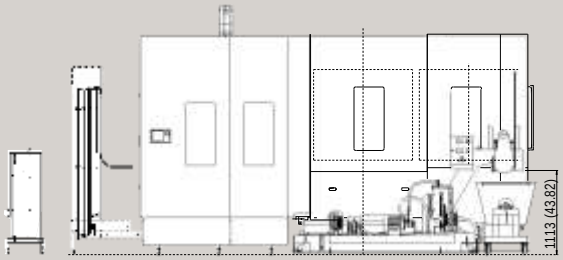
Unit : mm (inch)

HM 8000

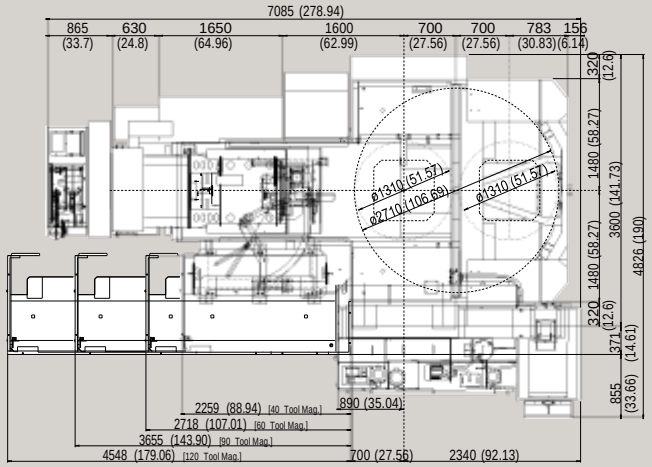
Front View



Side View

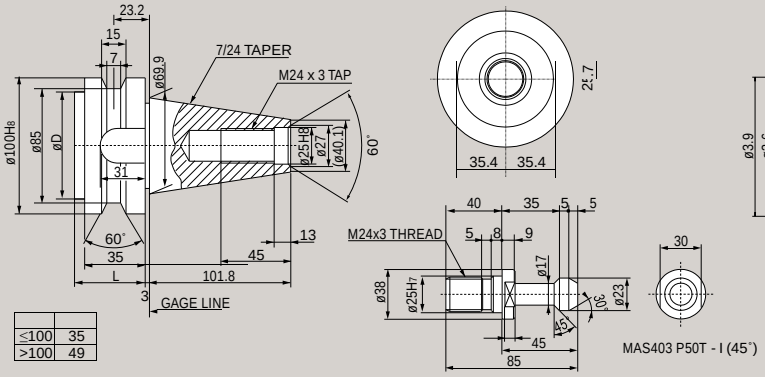


Top View

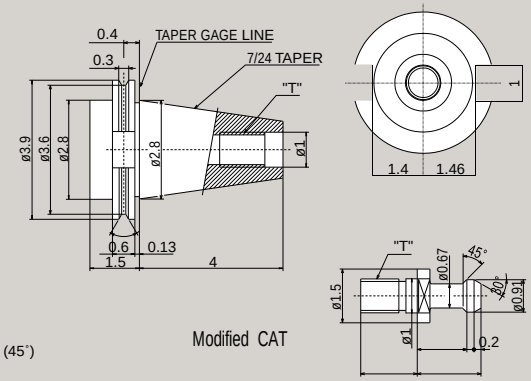


Tool Shank

BT50 Unit : mm



CAT50 Unit : in.



DIN50 Unit : mm

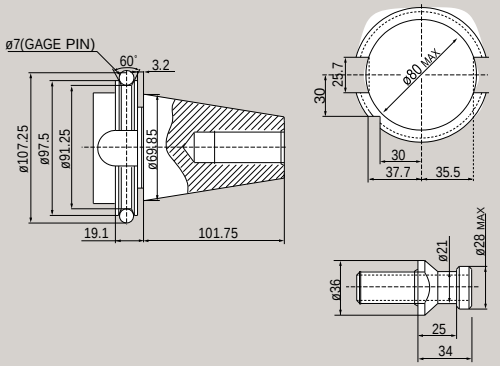
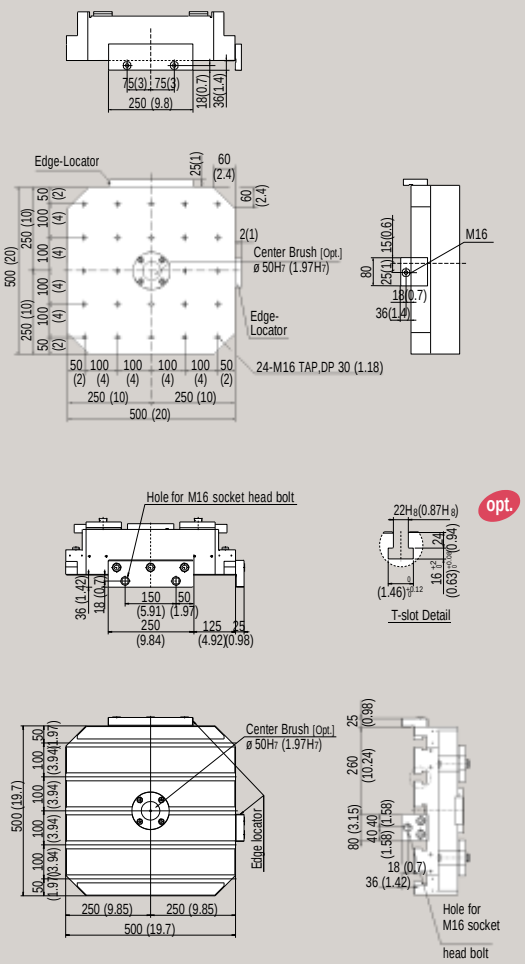


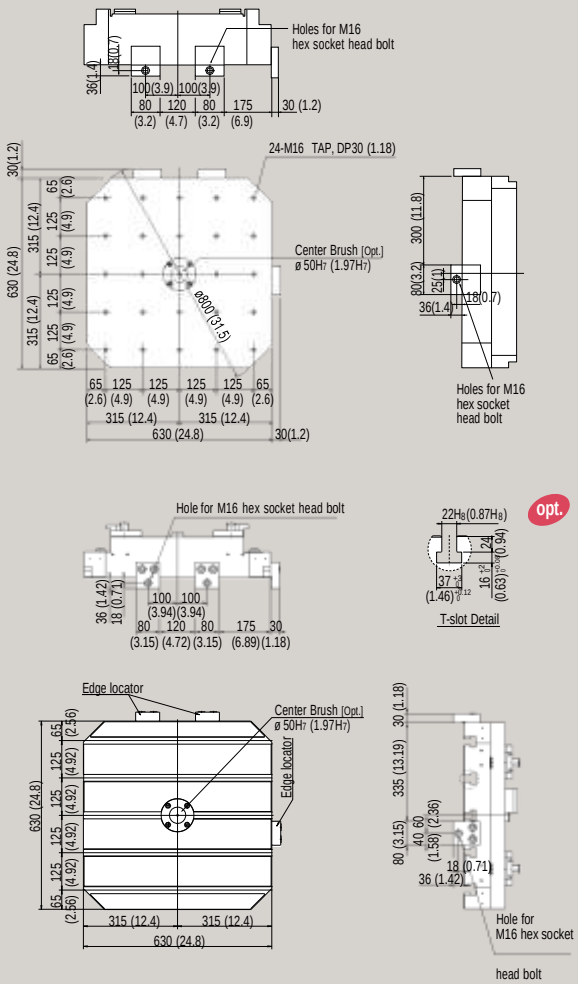
Table Dimensions

Unit : mm (inch)

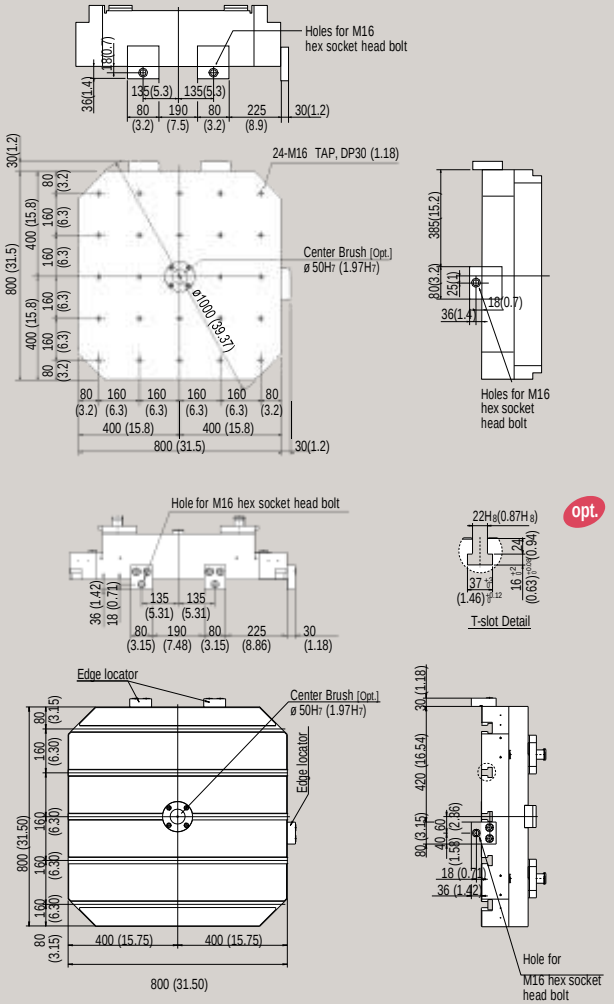
HM 5000



HM 6300



HM 8000



Machine Specifications

Features			HM 5000	HM 6300	HM 8000
Travel	X-axis(longitudinal movement of table)	mm (inch)	800 (31.5)	1000 (39.4)	1250 (49.2)
	Y-axis(head vertical)	mm (inch)	650 (25.6)	800 (31.5)	1000 (39.4)
	Z-axis(column cross)	mm (inch)	650 (25.6)	850 (31.5)	1000 (39.4)
	Distance from spindle center to pallet top	mm (inch)	50 - 700 (2 - 27.6)	75 - 875 (3 - 34.5)	75 - 1075 (3-42.3)
	Distance from spindle nose to table center	mm (inch)	150 - 800 (5.9 - 31.5)	150 - 1000 (5.9 - 39.4)	200 - 1200 (7.9 - 47.2)
Table	Pallet type		24-M16 x P2.0 Tap		
	Indexing degree	deg.	1° {0.001°}		
	Table loading capacity	kg (lb)	800 (1763.7)	1200 (2645.5)	1600 (3527.3)
	Pallet size	mm (inch)	500 x 500 (19.7 x 19.7)	630 x 630 (24.8 x 24.8)	800 x 800 (31.5 x 31.5)
Spindle	Max. spindle speed	r/min	6000 {8000}		
	Spindle taper		ISO #50 7/24 Taper		
	Max. spindle torque	N·m (ft-lbs)	813 (600) {1003 (740.2)}	1680 (1239.8) {1989 (1467.9)}	
Feedrate	Rapid traverse rate (X,Y,Z)	m/min (ipm)	24 (944.9) {32 (1259.8)}		
	Cutting feedrate	mm/min (ipm)	1~12000 (1~472.4)		
Automatic tool changer	Type of tool shank		BT50, CAT50, DIN 50		
	Tool storage capacity		40 {60 / 90 / 120 / 196 / 256 / 324}		
	Max. tool diameter	mm (inch)	130 (5.12)		
	Max. tool diameter without adjacent tools	mm (inch)	250 (9.8)		
	Max. tool length	mm (inch)	400 (15.8)	550 (21.7)	
	Max. tool weight	kg (lb)	25 (55.1)		
	Max tool moment	N·m (ft-lbs)	34.3 (25.3)		
	Method of tool selection		Fixed address		
	Tool changing time (tool-to-tool)	s	2.5		
	Tool changing time (chip-to-chip)	s	8	8.5	9
Automatic pallet changer	Number of pallets	ea	2		
	Type		Rotary type		
	Pallet change time	s	14	25	29
	Pallet rotation in loading station		90° Index		
Motor	Spindle drive motor (30 min.)	kW (Hp)	15 (20) {18.5 (25)}	22 (30) {26 (35)}	
	Feed motor(X/Y/Z/B)	kW (Hp)	3.0 / 4.0 / 4.0 / 1.6 (4.0 / 5.4 / 5.4 / 2.1)	4.0 / 7.0 / 7.0 / 3.0 (5.4 / 9.4 / 9.4 / 4.0)	
Power source	Electrical power supply (Rated capacity)	kVA	45	62	63
	Compressed air supply	MPa (psi)	0.54 (78.3)		
Tank capacity	Coolant tank capacity	L (gal)	620 (163.8)	550 (145.3)	
	Lubrication tank capacity	L (gal)	7.2 (1.9)		
Machine size	Machine height	mm (inch)	2760 (108.7)	3041 (119.7)	3330 (131.1)
	Machine dimensions (L x W)	mm (inch)	6682 x 3653 (263.1 x 143.8)	6990 x 4427 (275.2 x 174.3)	7085 x 4826 (278.9 x 190.0)
	Machine weight	kg (lb)	15000 (33068.9)	19000 (41887.2)	21000 (46296.4)

• Design and specifications are subject to change without notice.

• Doosan is not responsible for difference between the information in the catalogue and the actual machine.

Note : { } are optional.

NC Unit Specifications (Fanuc 31i-A)

AXES CONTROL

- Controlled axes	4 (X,Y,Z,B)
- Simultaneously controllable axes	4 axes
Positioning (G00) / Linear interpolation (G01) : 3 axes	
Circular interpolation (G02, G03) : 2 axes	
- Backlash compensation	
- Emergency stop / overtravel	
- Follow up	
- Least command increment :	0.001mm / 0.0001"
- Least input increment :	0.001mm / 0.0001"
- Machine lock	all axes / Z axis
- Mirror image	Reverse axis movement
(setting screen and M - function)	
- Stored pitch error compensation	
Pitch error offset compensation for each axis	
- Stored stroke check 1	Overtravel controlled by software

INTERPOLATION & FEED FUNCTION

- Positioning	G00
- Linear interpolation	G01
- Circular interpolation	G02, G03
- 2nd reference point return	G30
- Dwell	G04
- Exact stop check	G09, G61(mode)
- Skip function	G31
- Reference point return	G27, G28
- 2nd reference point return	G30
- Feed per minute	mm / min
- Rapid traverse override	F0 (fine feed), 25 / 50 / 100%
- Feedrate override (10% increments)	0 - 200%
- Jog override (10% increments)	0 - 200%
- Override cancel	M48 / M49
- Manual handle feed (1 unit)	
- Manual handle feedrate	0.1/0.01/0.001mm
- Automatic acceleration/deceleration	
- Helical interpolation	
- DSQ1 (AICC II + Machine condition selection function)	
200 block preview	
- Thread cutting, synchronous cutting	
- Program restart	
- Automatic corner deceleration (Specify AI Contour control II)	
- Feedrate clamp by circular acceleration	
- Linear ACC/DEC before interpolation	
(Specify AI Contour control II)	
- Linear ACC/DEC after interpolation	
- Control axis detach	
- Rapid traverse bell-shaped acceleration/deceleration	
- Smooth backlash compensation	

SPINDLE & M-CODE FUNCTION

- M- code function	M 3 digits
- Spindle orientation	
- Spindle serial output	
- Spindle speed command	S5 digits
- Spindle speed override (10% increments)	50 - 150%
- Spindle output switching	
- Retraction for rigid tapping	
- Rigid tapping	G84, G74

TOOL FUNCTION

- Tool nose radius compensation	G40, G41, G42
- Number of tool offsets	200 ea
- Tool length compensation	G43, G44, G49
- Tool number command	T3 digits
- Tool life management	
Geometry / Wear and Length / Radius offset memory	
- Tool offset memory C	
- Tool length measurement	

PROGRAMMING & EDITING FUNCTION

- Absolute / Incremental programming	G90 / G91
- Auto. Coordinate system setting	
- Background editing	
- Canned cycle	G73, G74, G76, G80 - G89, G99
- Circular interpolation by radius programming	
- Custom macro B	
- Custom size 512kb	
- Addition of custom macro common variables	
- Decimal point input	
- I / O interface	RS - 232C
- Inch / metric conversion	G20 / G21
- Label skip	
- Local / Machine coordinate system	G52 / G53
- Maximum commandable value	
±99999.999mm (±9999.9999 inch)	
- No. of Registered programs	500 ea
- Optional block skip	
- Optional stop	M01
- Part program storage	640 m
- Program number	O4-digits
- Program protect	
- Program stop / end	M00 / M02, M30
- Programmable data input	
Tool offset and work offset are entered by G10, G11	
- Sub program	Up to 10 nesting
- Tape code	ISO / EIA Automatic discrimination
- Work coordinate system	G54 - G59
- Additional work coordinate system(48 Pairs)	
G54.1 P1 - 48 pairs	
- Coordinate system rotation	G68, G69
- Extended part program editing	
- Macro executor	

OTHERS FUNCTIONS (Operation, Setting & Display, etc)

- Alarm display	
- Alarm history display	
- Clock function	
- Cycle start / Feed hold	
- Display of PMC alarm message	
Message display when PMC alarm occurred	
- Dry run	
- Ethernet function (Embeded)	
- Graphic display	Tool path drawing
- Help function	
- Loadmeter display	
- MDI / DISPLAY unit	
10.4" color LCD, Keyboard for data input, soft-keys	
- Memory card interface	
- Operation functions	Tape / Memory / MDI / Manual
- Operation history display	
- Program restart	
- Run hour and part number display	
- Search function	Sequence NO. / Program NO.
- Self - diagnostic function	
- Servo setting screen	
- Single block	
- External data input	
- Multi language display	

OPTIONAL SPECIFICATIONS

- 3-dimensional coordinate conversion	
- 3-dimensional tool compensation	
- 3rd / 4th reference return	
- Addition of tool pairs for tool life management	1024 pairs
- Additional controlled axes	max. 12 axes per 1path
- Additional work coordinate system	G54.1 P1 - 300 (300 pairs)
- DSQ 2	200 block preview
(AICC II + Machine condition selection function	
+ Data server + 1GB)	
- DSQ 3	600 block preview
(AICC II with High speed processing	
+ Machine condition selection function + Data server + 1GB)	
- Automatic corner override	G62
- Chopping function	G81.1
- Cylindrical interpolation	G07.1
- Dynamic graphic display (This can't use with the EZ Guide-i)	
Machining profile drawing	
- Interpolation type pitch error compensation	
- EZ Guide i (Doosan infracore Conversational Programming	
Solution) with 10.4" Color TFT	
- Tape format for FS15	
- Increment system 1/10	
- Figure copying	G72.1, G72.2
- Manual handle feed 2/3 unit	
- Handle interruption	
- High speed skip function	
- Involute interpolation	G02.2, G03.2
- Machining time stamp function	
- No. of Registered programs	1000 ea
- Number of tool offsets	400 / 499 / 999 / 2000 ea
- Optional block skip addition	2~9 blocks
- Part program storage	1280 / 2560 m
- Playback function	
- Polar coordinate command	G15 / G16
- Polar coordinate interpolation	G12.1 / G13.1
- Programmable mirror image	G50.1 / G51.1
- Remote buffer	
- Scaling	G50, G51
- Single direction positioning	G60
- Stored stroke check 2 / 3	
- Tool load monitoring function (doosan)	
- Doosan tool management package I	
- Tool offset	G45 - G48
- Position switch	
- Optional angle chamfering / corner R	

*) Pre discussion required

HM 5000 / 6300 / 8000

Heavy Duty Horizontal Machining Center

http://www.doosaninfracore.com/machinetools

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